



Risk Management at CSA – An Overview

NASA Risk Management Conference 2005

File: Risk Brief to NASA Risk Management Conference Dec 2005.ppt



Canadian Space Agency
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Canada



Presentation Contents

- CSA Corporate Overview
- Historical Background of RM at CSA
- RM today at CSA



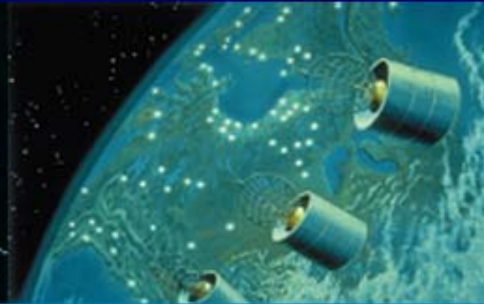
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SERVING CANADIANS FOR OVER 40 YEARS...
SERVING CANADIANS FOR OVER 40 YEARS...



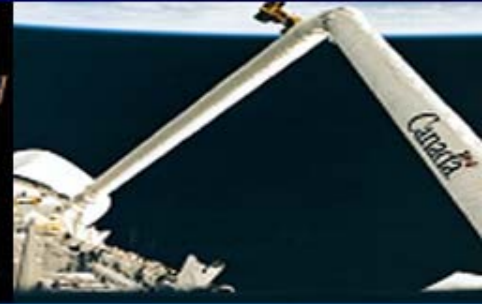
Alouette



Anik Series



Hermes



Canadarm

The Canadian Space Agency's Mandate

- "...to promote the peaceful use and development of space, to advance the knowledge of space through science and to ensure that space science and technology provide social and economic benefits for Canadians."





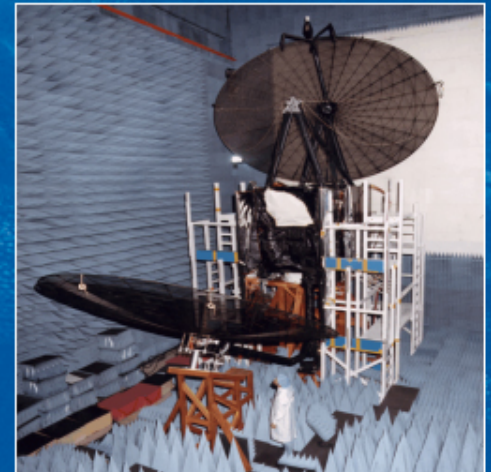
PROFILE

CANADIAN SPACE AGENCY

- Annual budget of about \$300M (75% contracted out to industry and academia)
- Approximately 600 employees, 240 students annually
- Headquarters: John H. Chapman Space Centre (Longueuil, Quebec)
- Offices in Ottawa, Washington, Paris, Houston
- Testing & Integration Facilities at David Florida Laboratory, Ottawa

QUALIFIED TEST & OPERATIONS INFRASTRUCTURES

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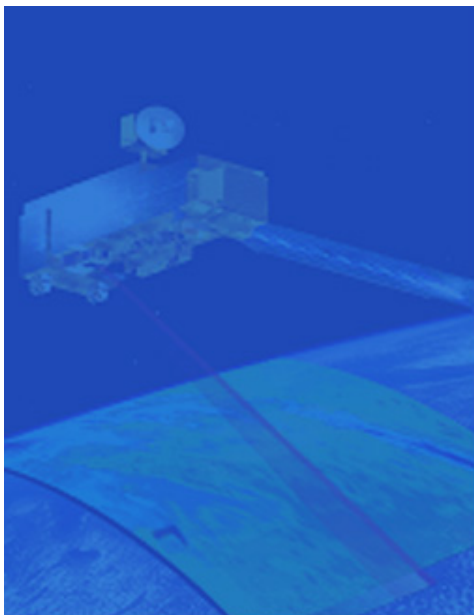


The David Florida Lab



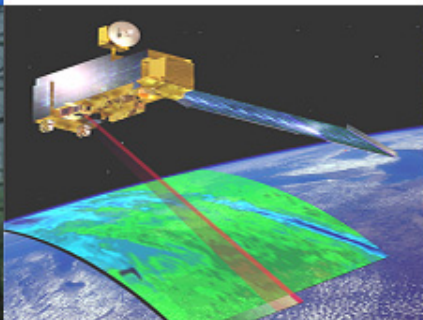
CORE THRUSTS

- **Earth Observation**
- **Space Science and Exploration**
- **Satellite Communications**
- **Space Awareness and Learning**



Monitoring the health of our planet from space

- Measuring pollution
- Studying ozone depletion
- Ensuring the stewardship of our natural resources
- Improved weather forecasting
- Monitoring natural disasters
- Sovereignty and security

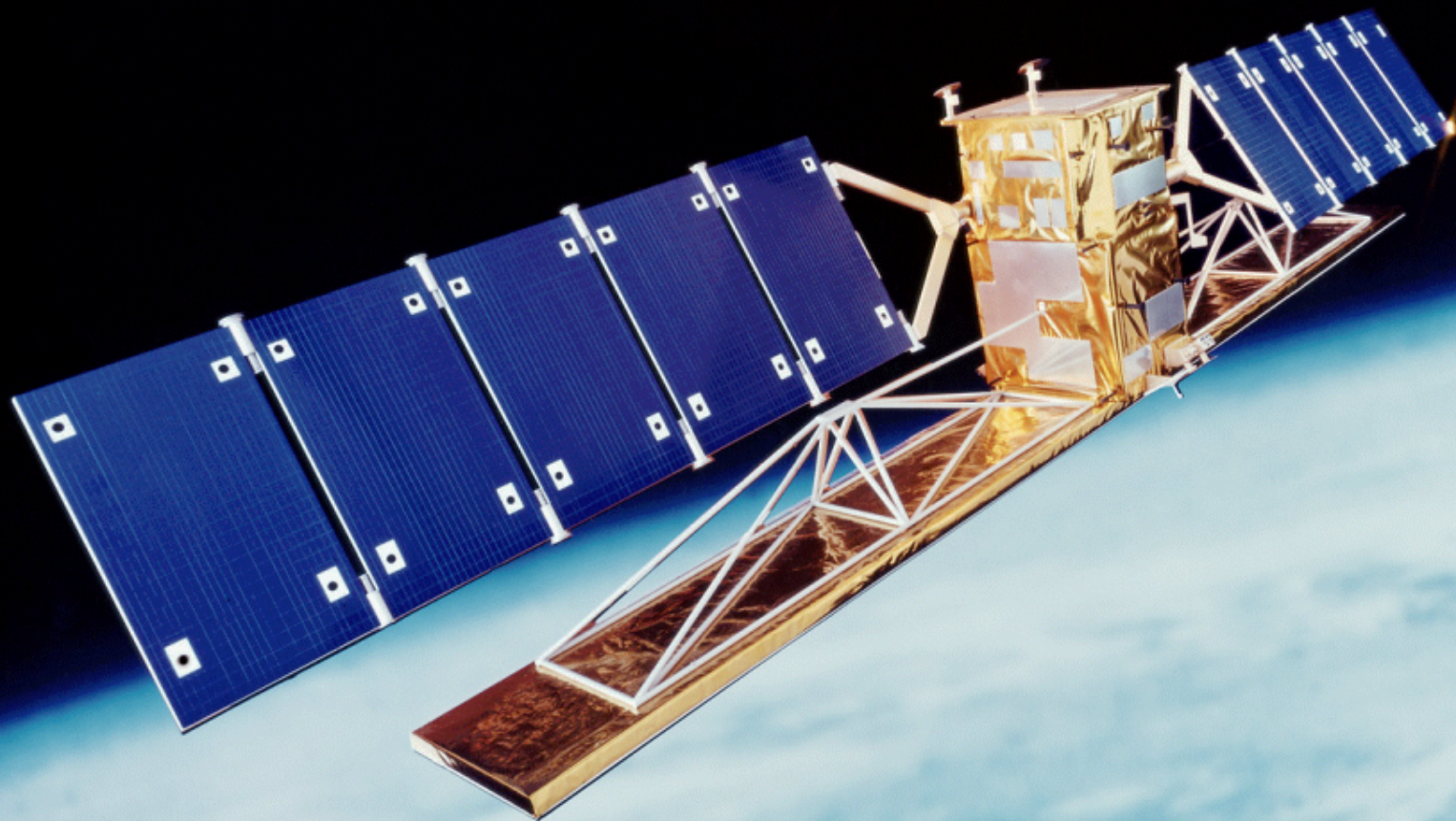


EARTH OBSERVATION





RADARSAT-1 – Assisting those in need



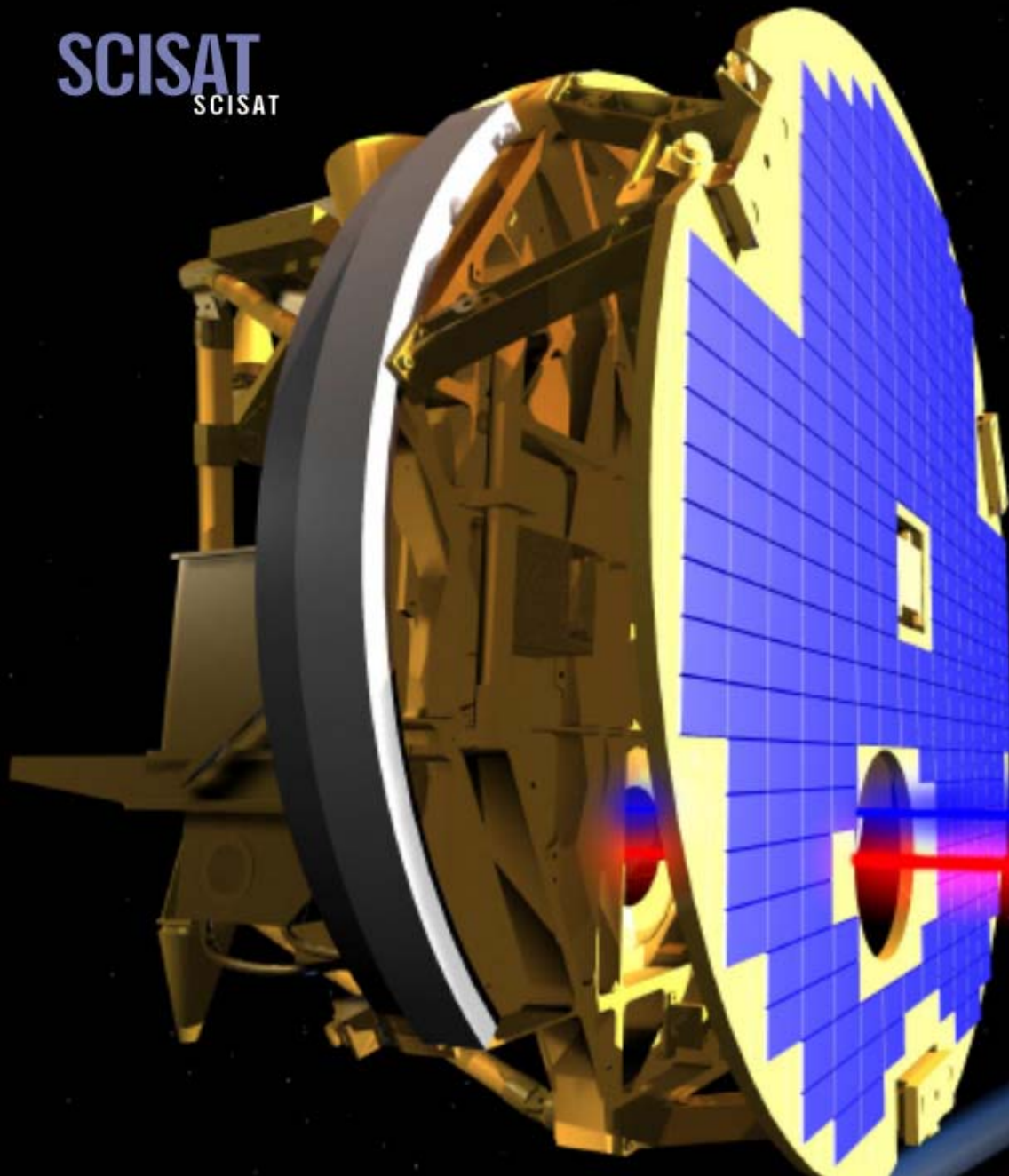
RADARSAT-2

RADARSAT-2

Helping to keep
Canada among the
leaders in space-
based, remote
sensing technologies



SCISAT
SCISAT



CLOUDSAT
CLOUDSAT



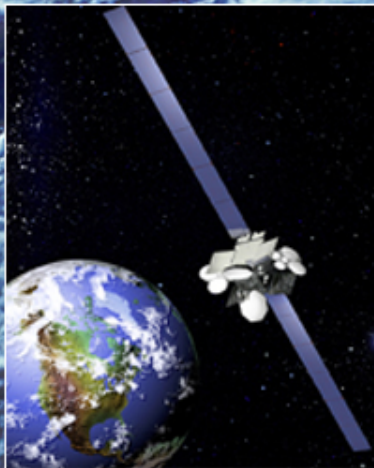


HYDROS



CONNECTING CANADIANS

CONNECTING CANADIANS

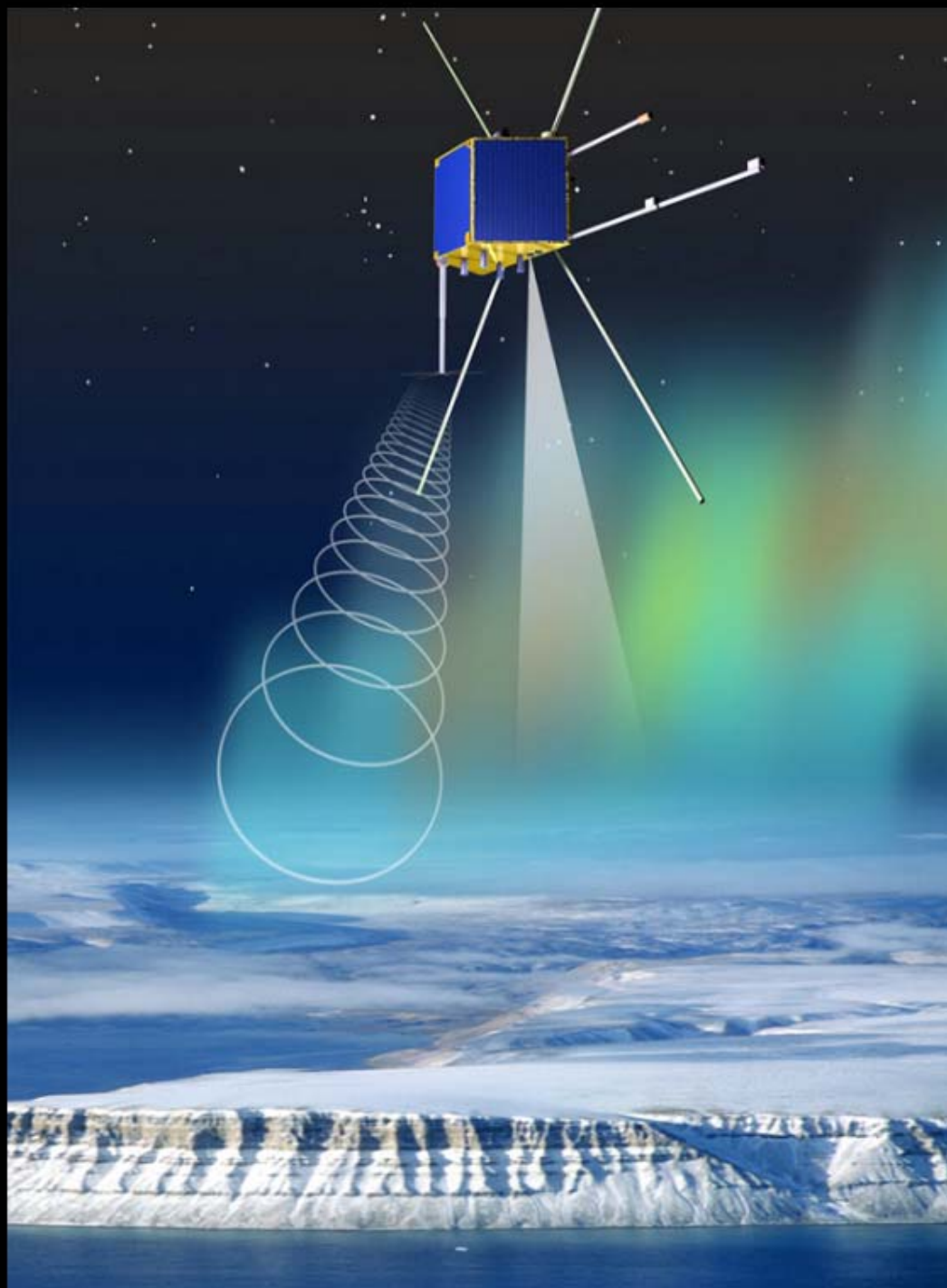


ANIK F2



CASSIOPE

CASSIOPE



SPACE SCIENCE & EXPLORATION

SPACE SCIENCE & EXPLORATION



THE INTERNATIONAL SPACE STATION

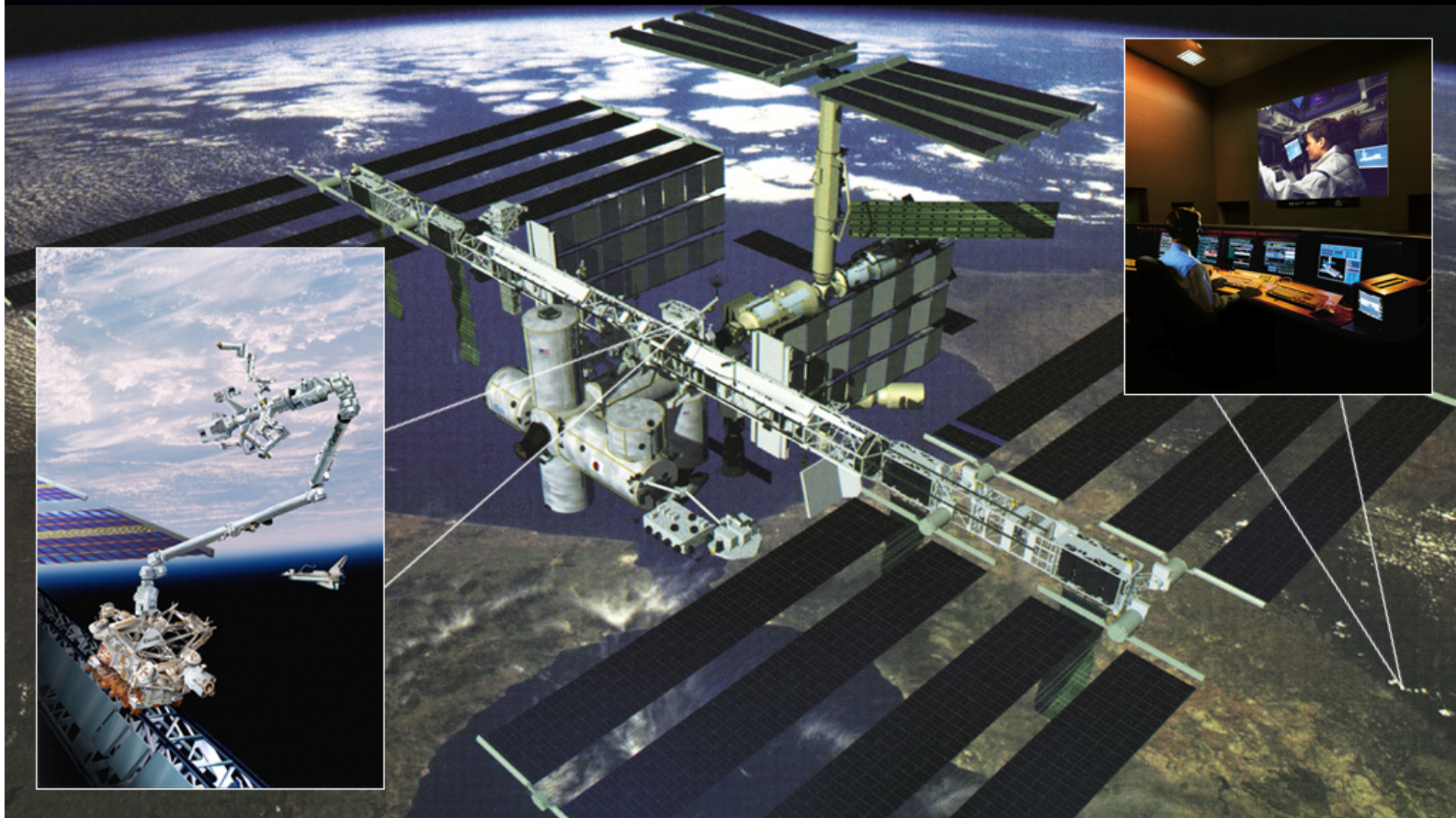
THE INTERNATIONAL SPACE STATION



THE INTERNATIONAL SPACE STATION

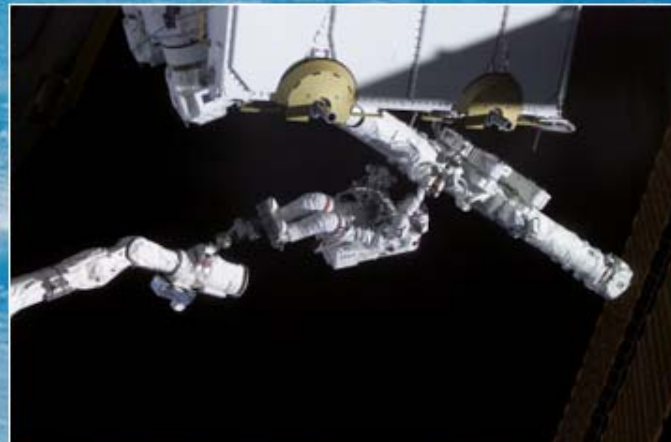
THE INTERNATIONAL SPACE STATION

Mobile Servicing System



A WORLD-RENOWNED TEAM OF ASTRONAUTS

A WORLD-RENOWNED TEAM OF ASTRONAUTS



Garneau '84

Bondar '92

MacLean '92

Hadfield '95

Garneau '96

Thirsk '96

Tryggvason '97

Williams '98

Payette '99

Garneau 2000

Hadfield 2001

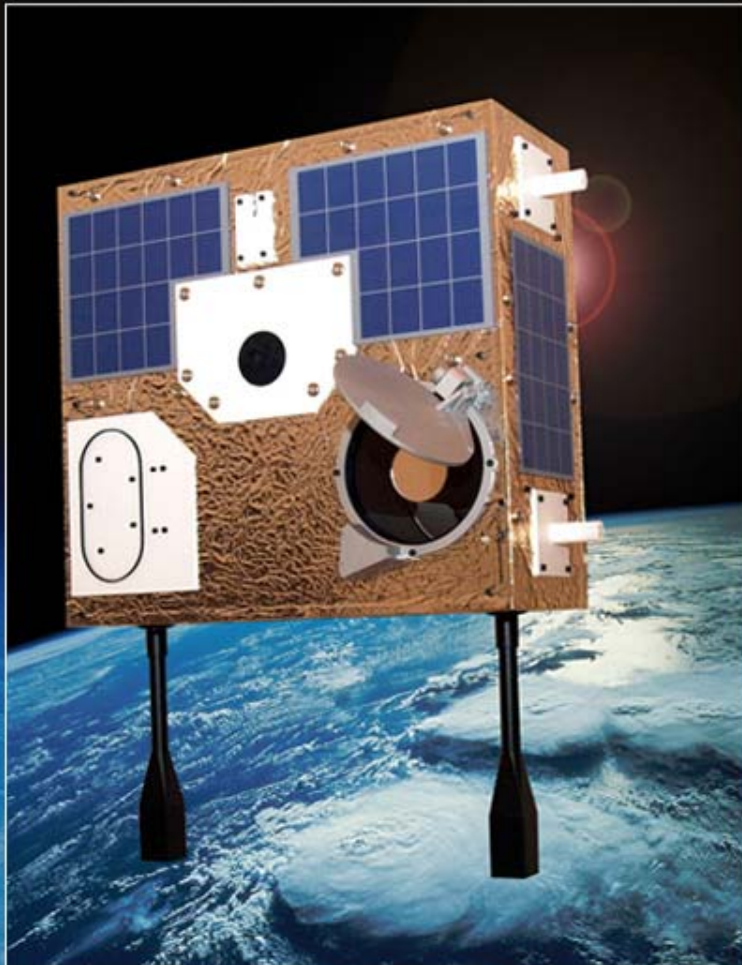
MacLean

Williams

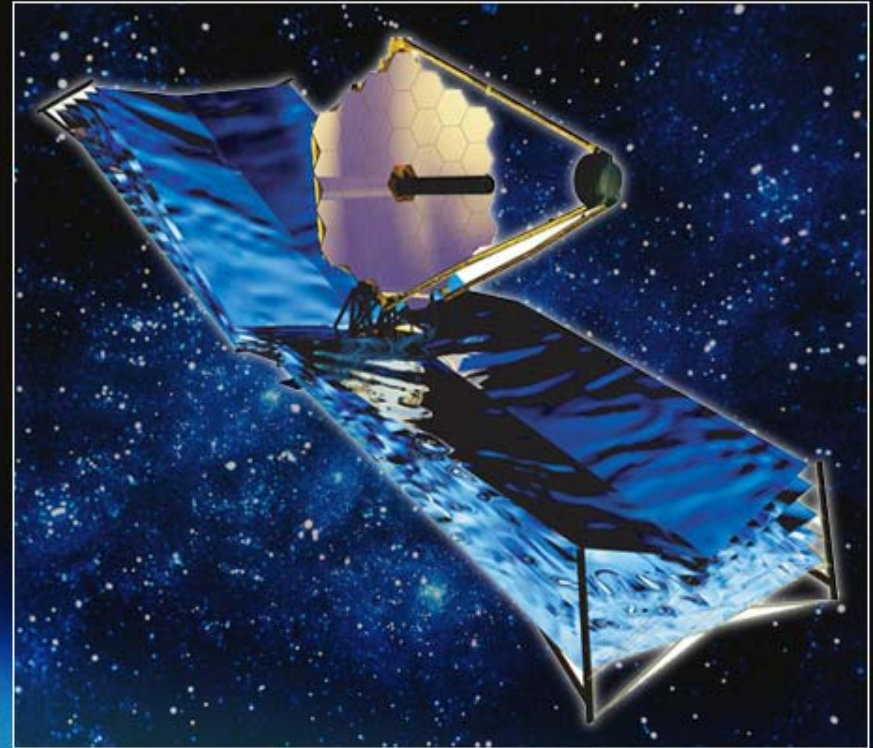
SPACE SCIENCE & EXPLORATION

SPACE SCIENCE & EXPLORATION

Astronomy and the Solar System

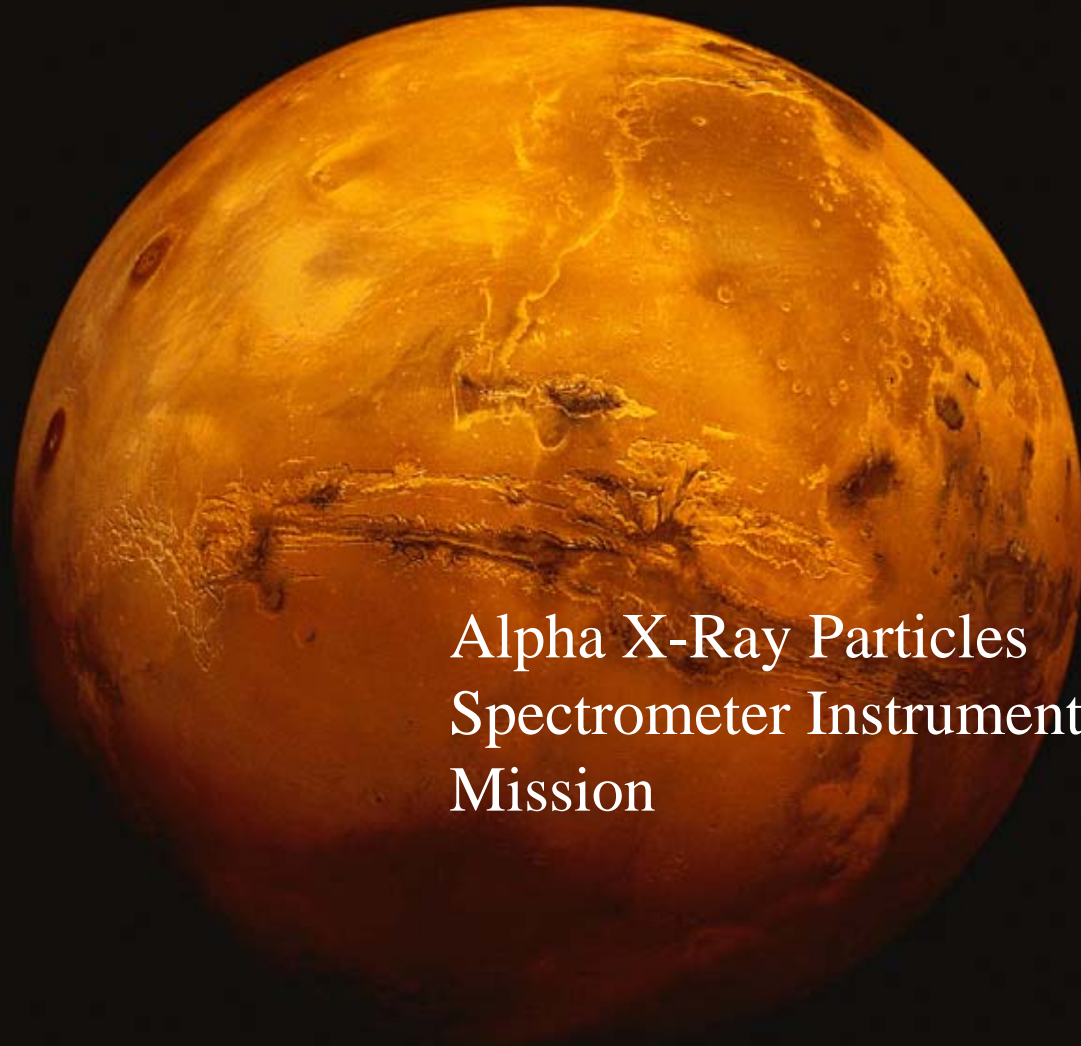


MOST

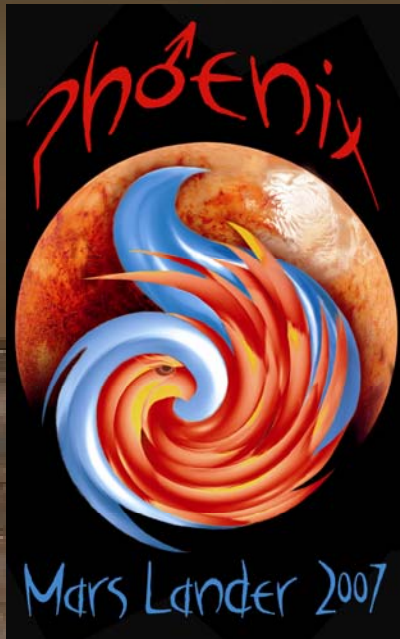


JWST

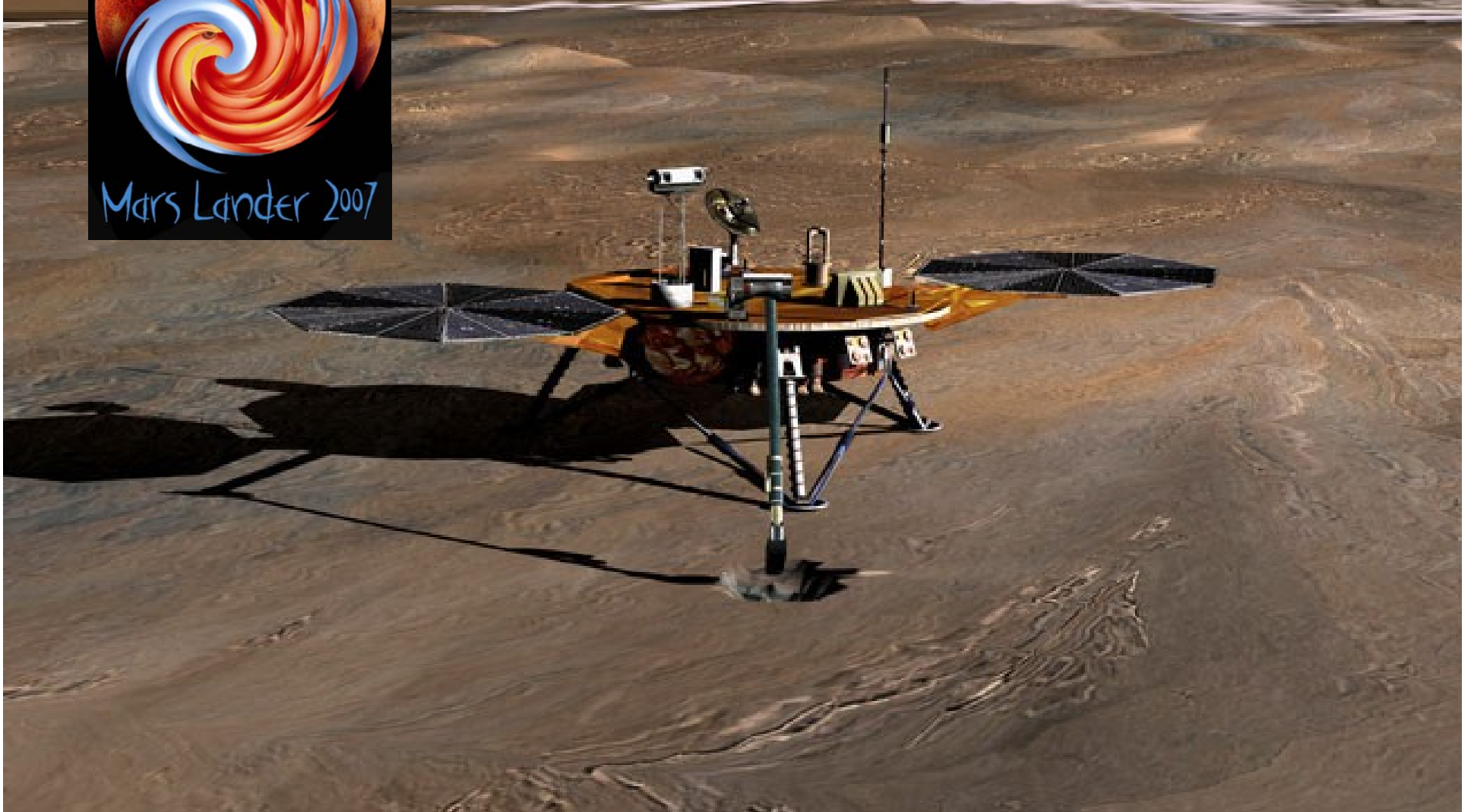
MARS
MARS



Alpha X-Ray Particles
Spectrometer Instrument on MSL
Mission



MET Station (LIDAR with Pressure and Temperature sensing Instrument) on Phoenix Mission



Historical Background of RM at CSA



1989 - CSA created

- Two Major Projects (CSSP & RDST-1) influenced CSA Project Management development
- As well as TB, DND and NASA, in particular
- But also other space agencies, IAF, OGDs, industry partners and PMI

1994 - RIAS was developed for CSSP

- Risk identification and assessment system
- Consistent with NASA terminology and reporting

1996 - CSA re-org with 2 Risk Management Focus Groups

- Finance Directorate: CSA Cost Risk
- Space Programs: Project Risk Management



Historical Background of RM at CSA



After 1996

- ❏ Planning, Reporting, Accountability Structure (PRAS) (plus overall fixed yearly funding)
- ❏ CSA RMF (plus internal project approval of \$1M)
- ❏ PAMF (and increased delegated authority to \$5M)
- ❏ Results for Canadians
- ❏ Modern Comptrollership
- ❏ CSSP Project close out report (Lessons Learned)
- ❏ Audit's Report
- ❏ Management Accountability Framework (MAF)



Historical Background of CSA

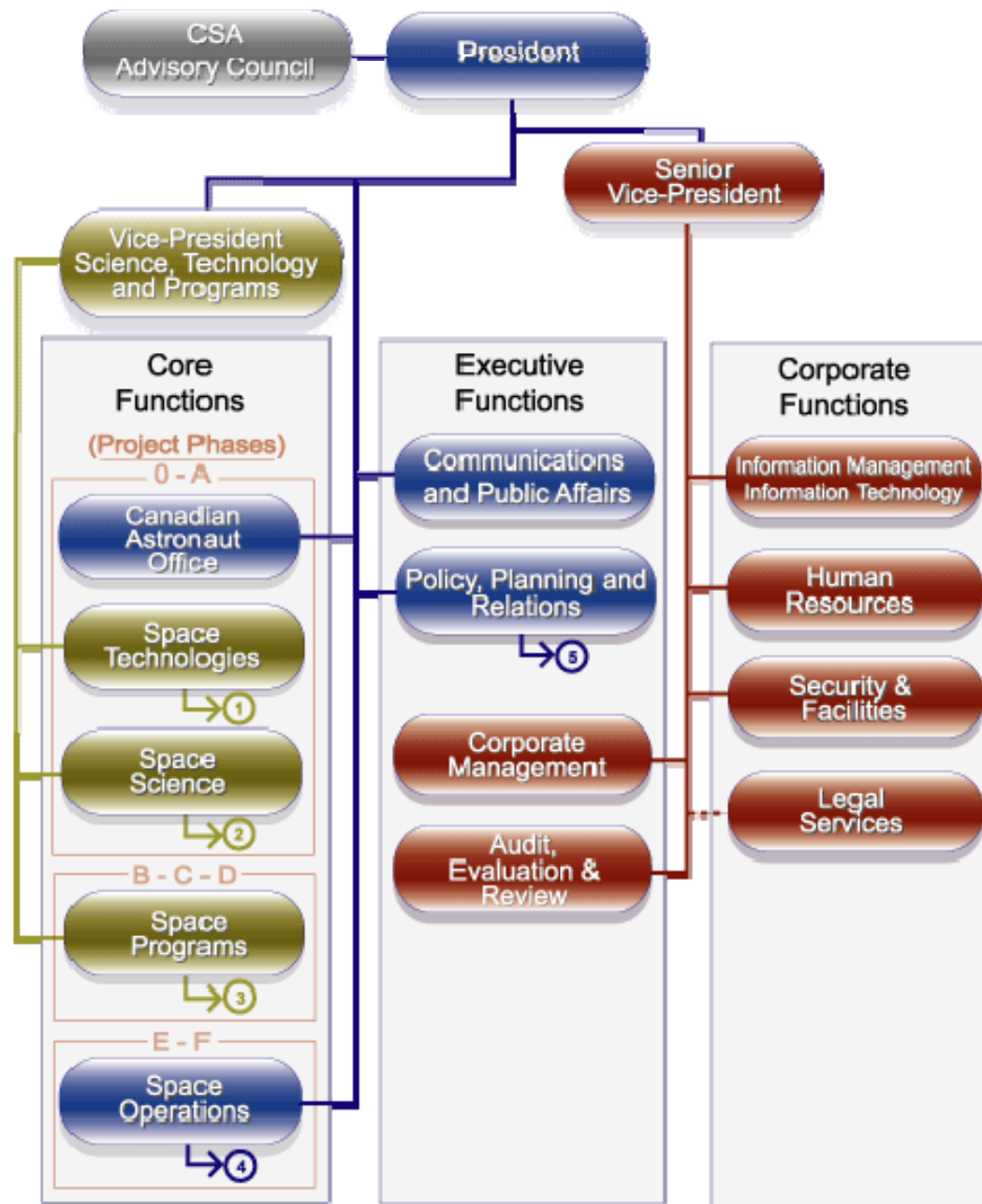


2001 – Marc Garneau was appointed as the CSA president

A number of re-organization followed:

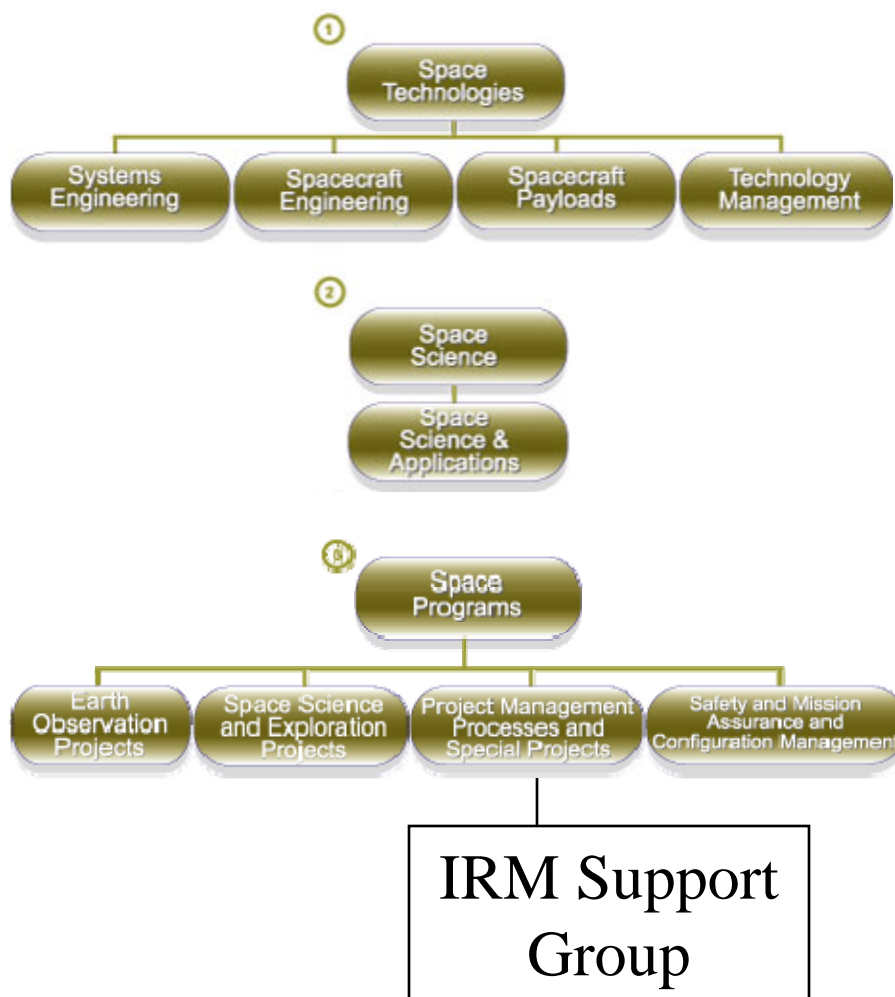
- CSA moved from a former Major Crown Project structure to a Matrix structure
- Systems Engineering moved from Sp. Pgms (formerly Sp. Systems) directorate to Sp. Tech. Directorate
- MSS Operations organisation moved from Sp. Pgms directorate to Sp. Ops directorate
- Risk Management and S&MA organisations remained under Sp. Pgms directorate

CSA Organisation Top Level

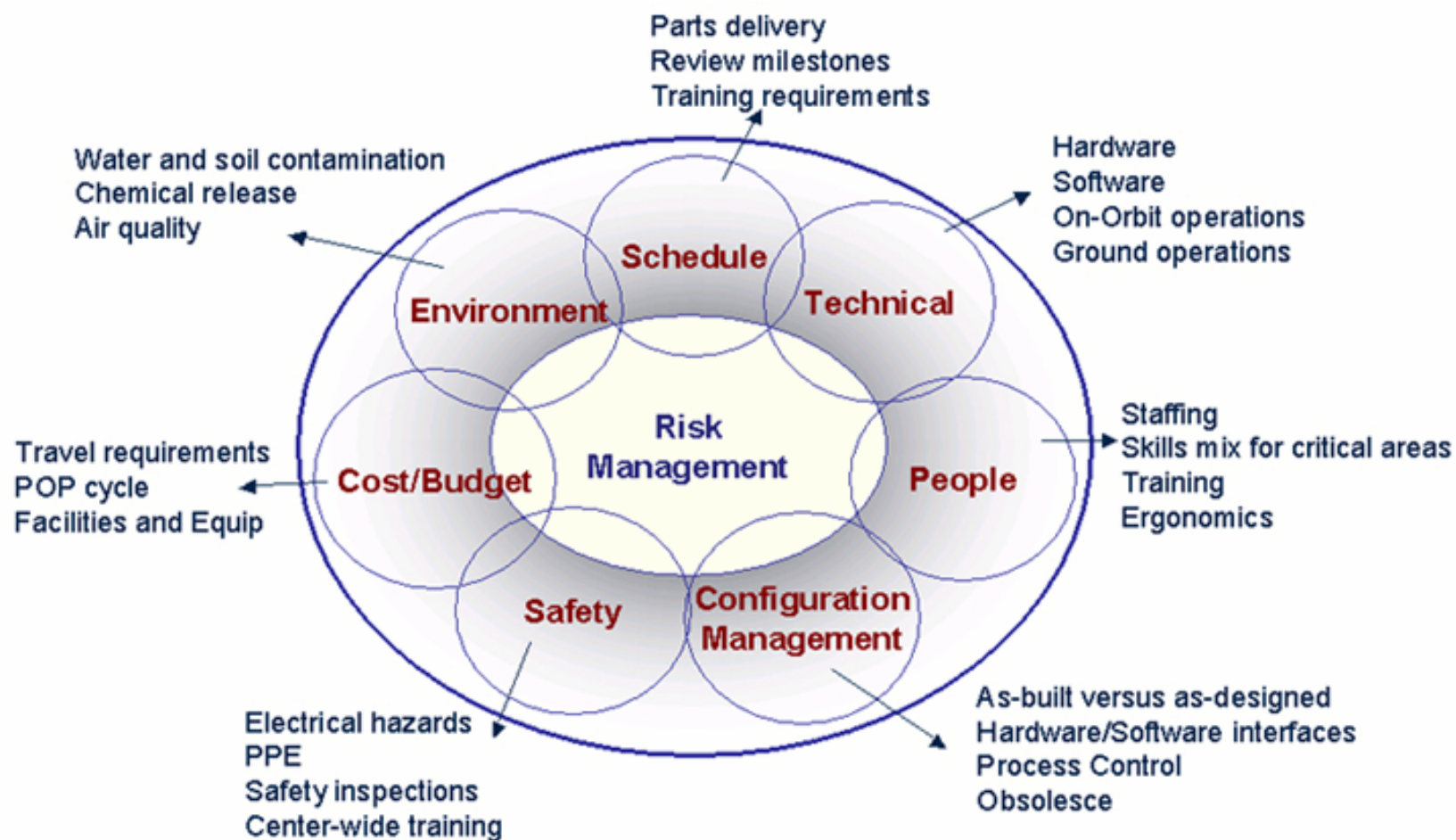


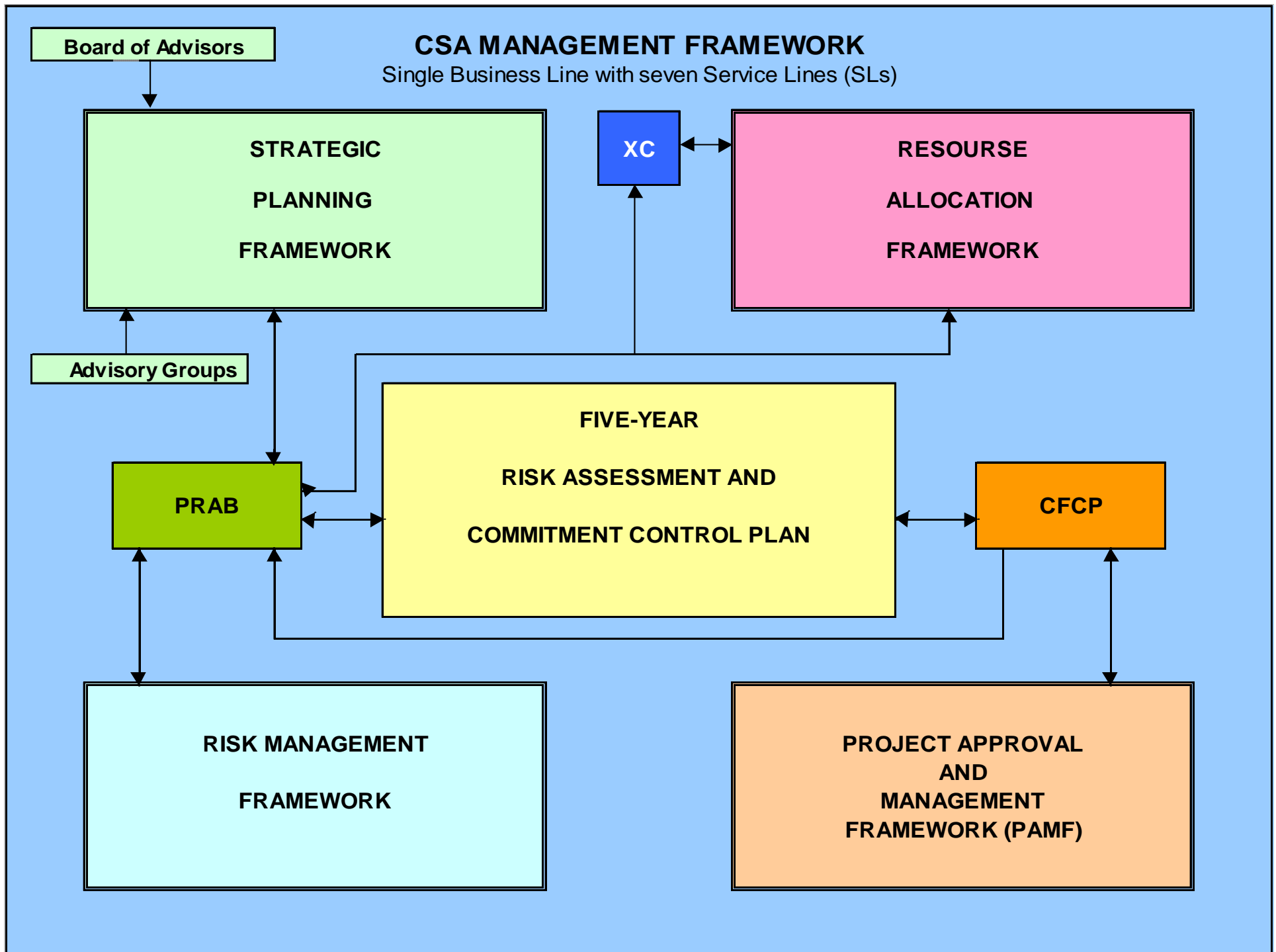


CSA Core Functions



RM today at CSA







Risk Management Framework

- RMF was approved by TB in December 1999, in the context of the government decision to endow CSA with a stable A-Base budget
- To ensure that the Canadian Space Program and associated risks can be funded within the Multi-Year Approved Reference Levels
- As a result, new initiatives are funded only when ongoing program risks are under control



Risk Management Framework



Key to the CSA Risk Management Framework is the integration of Risk Management into the Agency's long-term and annual planning, resource allocation and performance framework. Hence, project risk management at the CSA implies 3 levels of management;

- 1-) Corporate level including the Service Lines (CSA integrated Risk Management)
- 2-) Project Level (Project Risk Management)
- 3-) Work Package level (continuous monitoring and assessment of risks).





PAMF RISK MANAGEMENT

■ PRM DERIVED FROM:

- 💡 TB GUIDELINES
- 💡 PMI PMBOK
- 💡 CSA RISK MGT FRAMEWORK

■ PRM IMPLIES 3 LEVELS OF MANAGEMENT

- 💡 ITEM MANAGER (WORK PACKAGE)
- 💡 PROJECT MANAGER (PROJECT LEVEL)
- 💡 CORPORATE (CSA MISSION)

■ PROJECT APPROVAL DOCUMENT (PAD)

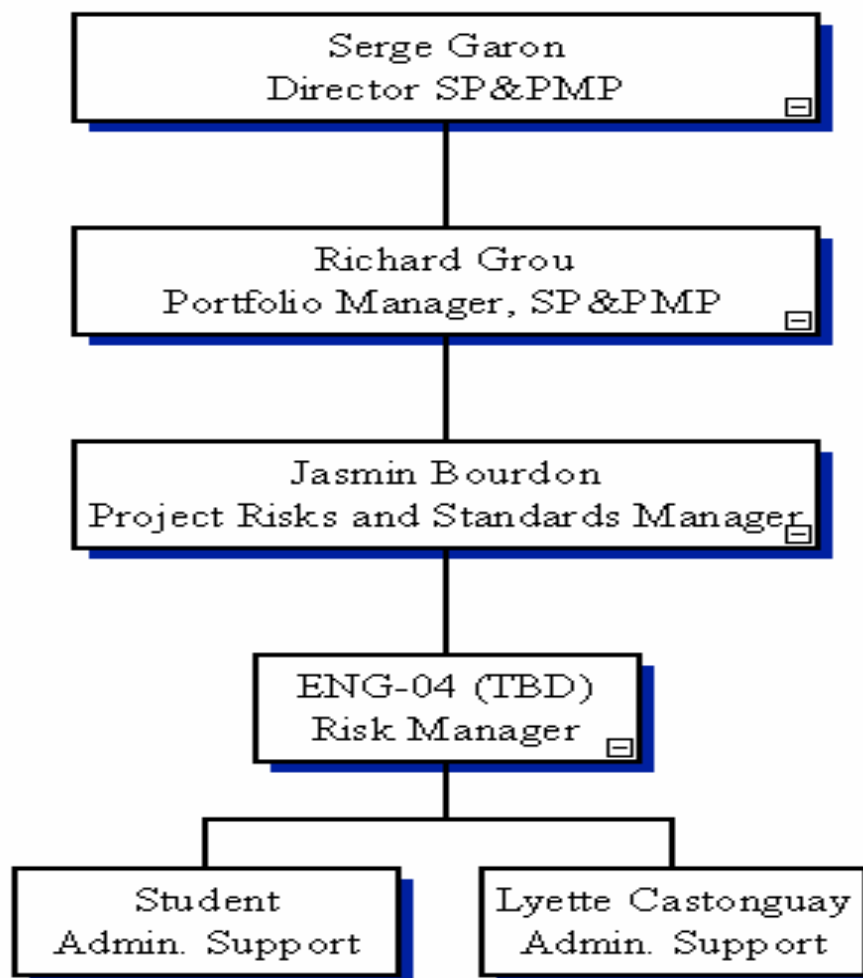
- 💡 GENERAL DESCRIPTION
- 💡 WBS

■ PROJECT REVIEW ADVISORY BOARD (PRAB)





Risk Management Support Team Organization





Risk Management Support Team's Mandate

- Facilitate training and workshops to help project teams identify, analyze, and mitigate risks contained in project or program.
- Provide ongoing consultation, facilitation, and training, as well as formulate, select, and execute strategies to support project management decision making.
- Support the PM in monitoring project or program activities and track these activities to ensure the effectiveness of each risk-related task.

Project Level Risk Management Process



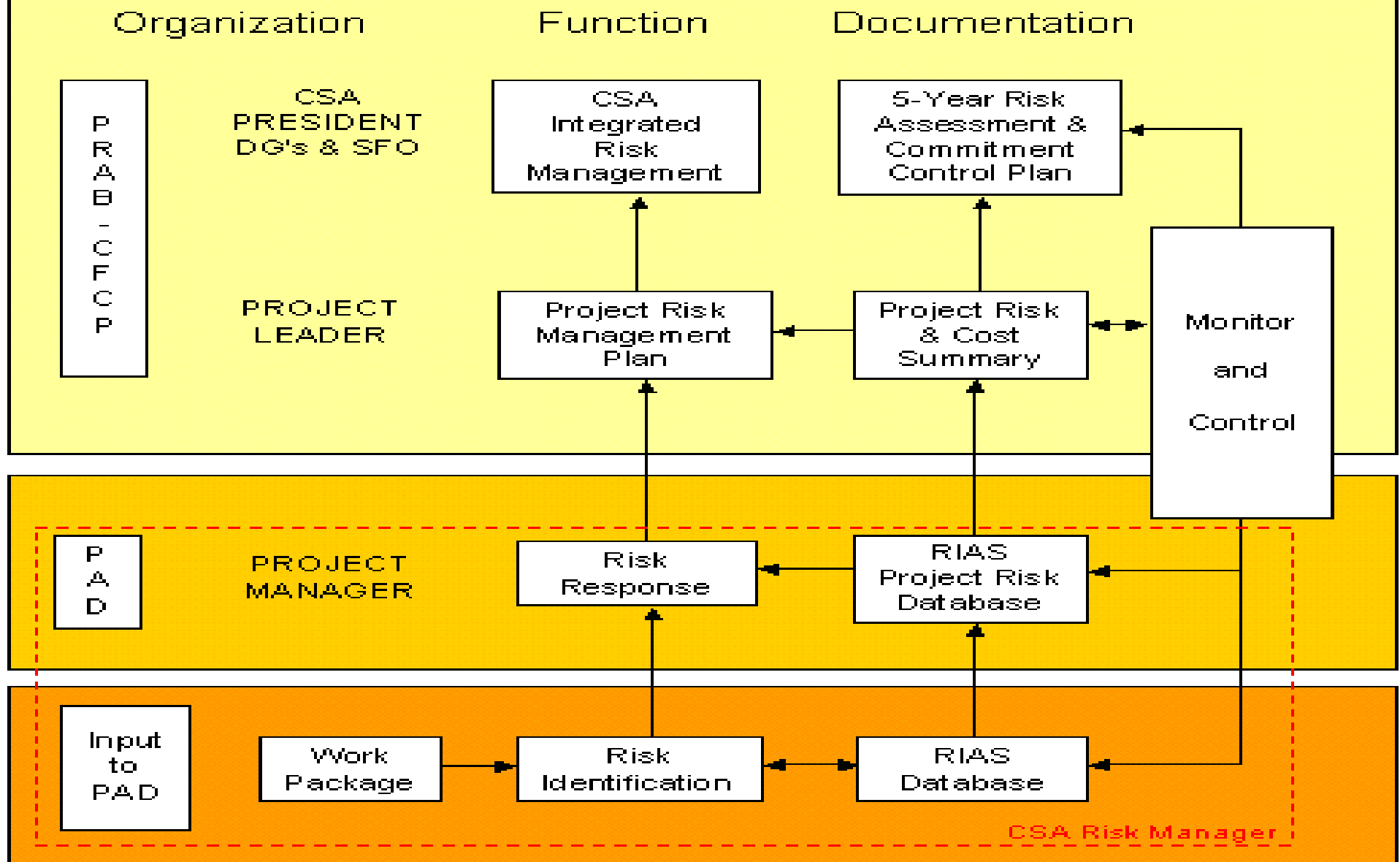
Activities called for in Risk Management Plans for projects



1. Risk Management and Strategy Planning
2. Risk Identification
3. Qualitative Risk Analysis
4. Quantitative Risk Analysis
5. Risk Response Plan
6. Risk Monitoring and Control



CSA Integrated Risk Management Flowchart



RIAS Risk Summary Report



		RISK # 01.5																																											
WBS Number: 1.2		Cost Account: Phase E				Risk Owner: Alain Dubeau																																							
Date Opened: 10/25/1999		Date Closed:		Rev #: 51		Last Update: 09/12/2001																																							
						<div style="display: flex; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 5px;">L I K E L I H O O D</div> <table border="1"> <tr><td>5</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td><td></td><td></td><td style="text-align: center;">O</td></tr> <tr><td>3</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> </table> </div> <div style="text-align: center; font-weight: bold; margin-top: 5px;">C O N S E Q U E N C E</div>				5						4					O	3						2						1							1	2	3	4	5
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	1	2	3	4	5																																								
COST EFFECT	TOTAL	FY 00/01	FY 01/02	FY 02/03	FY 03/04	FY 04/05	FY 05/06	FY 06/07	FY 07/08																																				
	\$13,640.K	\$0K	\$748.571K	\$1,295.714K	\$1,817.143K	\$2,644.286K	\$3,242.857K	\$3,891.429K	\$0K																																				
COST EFFECT RANGE																																													
SCHEDULE EFFECT	1 to 6 months																																												
PERFORMANCE EFFECT	TBD																																												
SAFETY EFFECT	TBD																																												
PROGRAMMATIC EFFECT																																													
RESPONSE PLANS																																													
#	ACTION	ACTIONEE		DATE																																									
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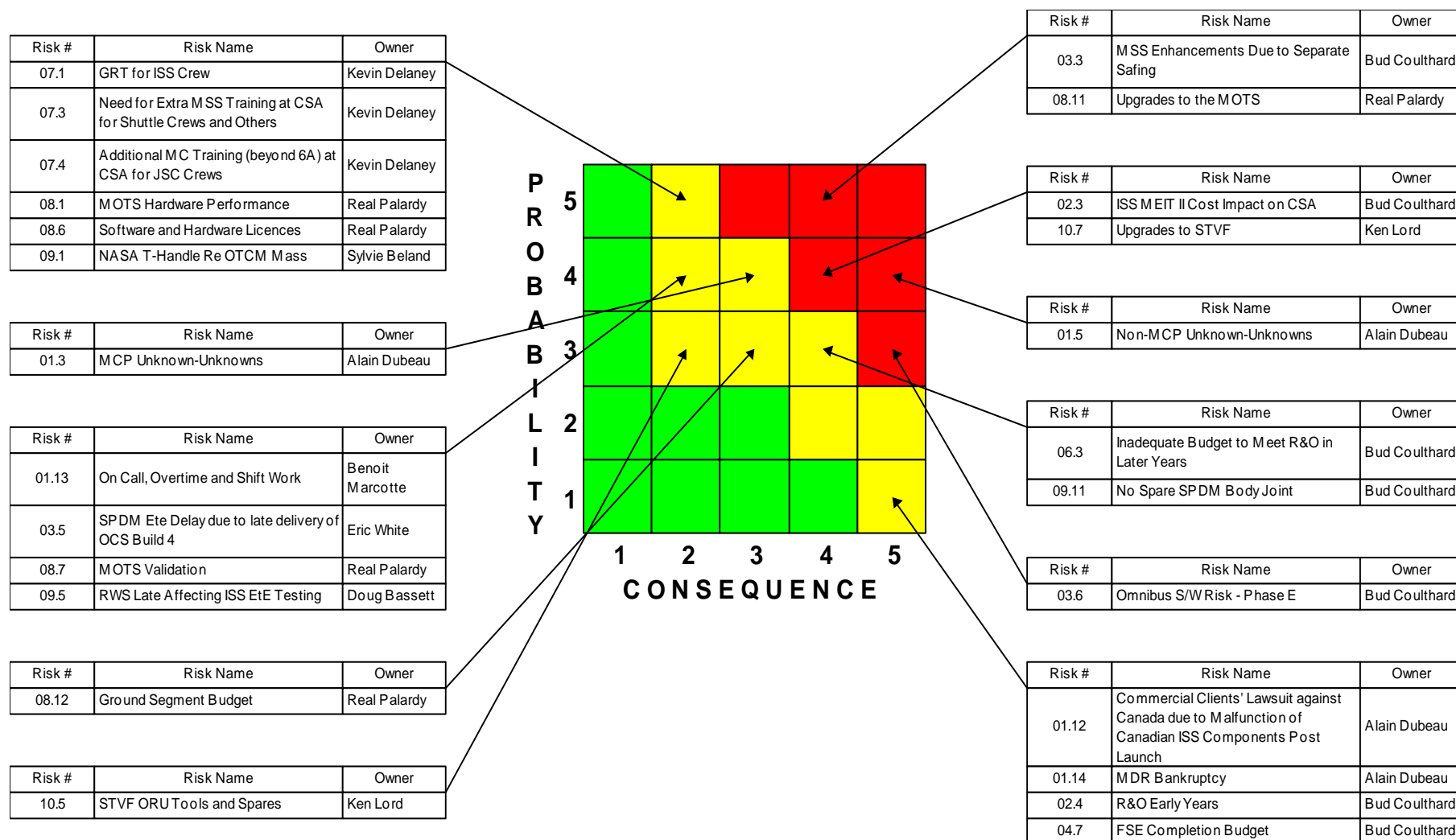
RIAS Weighted Risk Report

Project: Space Station Cost Summary Report: Weighted Cost Report - September -01 Baseline Date: 12-Sep-2001											
Risk #	WBS Number	Cost Account	Risk Name	Risk Owner	Date Opened	Last Update	C	L	Weighting	FY 01/02 (\$'000)	WEIGHTED COST TOTAL (\$'000)
01.1	1.2.1.1-A	Phase E	Jammed Extended SSRMS with Astronaut at the End	Victor Chang	30-Apr-1998	09-Aug-2001	4	1	10%	0	100
01.3	1.1	CSSP MCP	MCP Unknown-Unknowns	Alain Dubeau	21-Oct-1999	03-Aug-2001	3	4	70%	700	1,190
01.5	1.2	Phase E	Non-MCP Unknown-Unknowns	Alain Dubeau	25-Oct-1999	12-Sep-2001	5	4	70%	524	9,548
01.9	1.2-3	Phase E	Space Station Assembly Sequence Delay	Alain Dubeau	25-May-1998	03-Aug-2001	4	1	10%	0	175
01.10	1.2.1-A	Phase E	High Contract Personnel Turnover	Benoit Marcotte	05-Jan-2000	08-Dec-2000	3	1	10%	0	250
01.11	1.2	Phase E	L&SE Contract - MD-R Default	Benoit Marcotte	20-Mar-2000	08-Dec-2000	1	1	10%	0	0
01.12	1.2.1-A	Phase E	Commercial Clients' Lawsuit against Canada due to Malfunction of Canadian ISS Components Post Launch	Alain Dubeau	07-Jan-2000	12-Sep-2001	5	1	10%	0	0
01.13	1.2	Phase E	On Call, Overtime and Shift Work	Benoit Marcotte	28-May-2000	03-Aug-2001	3	4	70%	0	560
01.14	1.2	Phase E	MDR Bankruptcy	Alain Dubeau	19-Jul-2000	12-Dec-2000	1	1	10%	0	0
01.15	1.2	Phase E	Inflation More Than Normal	Alain Dubeau	19-Jul-2000	09-Aug-2001	4	2	30%	0	600
02.1	1.1.2.2.2.2-A	CSSP MCP	Integration-Level Design Problems	Eric White	19-Apr-1996	09-Aug-2001	2	2	30%	0	30
02.3	1.2.5	Phase E	ISS MEIT II Cost Impact on CSA	Bud Coulthard	21-Oct-1999	12-Sep-2001	5	4	70%	210	210
02.4	1.2.5.5-A	Phase E	R&O Early Years	Bud Coulthard	17-Nov-1999	09-Aug-2001	5	1	10%	0	1,900
03.1	1.1.2.2.1.11-A	CSSP MCP	SSRMS Russian FGB Interface Problems	Mike Stieber	19-Sep-1996	08-Dec-2000	1	1	10%	0	0
03.3	1.2.5.3	Phase E	MSS Enhancements Due to Separate Safing	Bud Coulthard	28-May-2000	13-Mar-2001	4	5	90%	0	3,600
03.5	1.1.2.2.3.4	CSSP MCP	SPDM Ete Delay due to late delivery of OCS Build 4	Eric White	30-Jun-2000	12-Sep-2001	3	4	70%	0	350
03.6	1.2.5.3.A	Phase E	Omnibus S/W Risk - Phase E	Bud Coulthard	07-Aug-2000	04-Jul-2001	5	3	50%	0	5,000
TOTALS:										3,154	39,635





RIAS Project Level Risk Matrix



CONSOLIDATED RISK ADVISORY BOARD



CRAB AGENDA

■Chair of Meeting: Director General

■Opening Remarks -

- ⌚ Level II Baseline as of October 24/01

■Reports Attached

- ⌚ Risk Matrix: Red/Yellow Zone, CSSP MCP, Phase E, Short Term (01/02), Long Term
- ⌚ Cost Reports: Unweighted Costs, Weighted Costs, Roll Up by Project

■Update of LSE Plan Related to the CRAB Actions :

- ⌚ Risk 4.5 No Spare SSRMS Boom
- ⌚ Risk 9.11 No Spare SPDM Body

■New Risks

- ⌚ 1.16 Over Utilization of the MSS On-Orbit
- ⌚ 3.11 OEUCS Memory Utilization

■Conclusions and Recommendations



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Five-Year Risk Assessment and Commitment Control Plan



- The Plan identifies risks and sources of frozen funds by program and project
- The Plan is continuously maintained up to date but formally reviewed by PRAB three times a year
 - ⌚ Work Plan (April)
 - ⌚ ARLU submission (August)
 - ⌚ Mid-year Performance Review (November)





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